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EXAMINER	
PEREZ, ANGELICA	
ART UNIT	**PAPER NUMBER**
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4

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/987,722	BROTHERS ET AL.
	Examiner	Art Unit
	Angelica M. Perez	2684

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 15 November 2002.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-56 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-56 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 2.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1,3-4,7-12, 14-19, 21-22, 24-29, 31-33, 35-38 are are rejected under 35 U.S.C. 102(e) as being anticipated by Ylitalo (Ylitalo et al.; US Patent No.: 6,788,661 B1).

Regarding claims 1 and 22, Ylitalo teaches of a method for wireless communication (column 1, lines 7-11; e.g., “down link signal transmission from a base station of a cellular radio system to a remote station”; and title of the application), for a first user (figure 1, item 2; where the signals transmitted from the base station are received by the user) comprising: determining a first downlink transmission beam and a second downlink transmission beam based on a received user-derived signal (column

3, lines 23-28; where the first and second adjusted transmit powers are determined based on the power coefficient indicator information received"), the first downlink transmission beam being substantially uncorrelated with the second downlink transmission beam (column 3, lines 34-37; where spaced-time coded signals are contained within an uncorrelated angular spread; also, column 1, lines 49-53), the first downlink transmission beam being associated with a portion within a first sector, the second downlink transmission beam being associated with a portion within a second sector (column 3, lines 31-37; e.g., " ...respective first and second beams..."; where each beam corresponds to a sector); diversity encoding a first signal to produce a first diversity-encoded signal; diversity encoding a second signal to produce a second diversity-encoded signal (column 3, lines 18-19; where the signals were encoded according to the different "power coefficient indicators"); sending the first diversity-encoded signal over the first downlink transmission beam; and sending the second diversity-encoded signal over the second downlink transmission beam (column 3, lines 33-37; e.g., "transmits the first and second signals in respective first and second beams").

Regarding claim 36, Ylitalo teaches of an apparatus (figure 11), comprising: a searcher (figure 1, item 1), the searcher being configured to identify a received user-derived signal (figure 1, item 1; where the receiver scans and identifies signals); a beam controller coupled to the a first transmit beam switch coupled to the beam controller (figure 11, item 40; column 11 lines 22-25); a second transmit beam switch coupled to the beam controller figure 11, item 40); a diversity coder coupled to the first transmit

beam switch and the second transmit beam switch (figure 11, item 10), the diversity coder configured to send a first diversity encoded signal to the first transmit beam switch based on the user-derived signal (column 3, lines 23-28; where the first and second adjusted transmit powers are determined based on the power coefficient indicator information received"), the first downlink transmission beam being substantially uncorrelated with the second downlink transmission beam (column 3, lines 34-37; where spaced-time coded signals are contained within an uncorrelated angular spread; also, column 1, lines 49-53), the first downlink transmission beam being associated with a portion within a first sector, the second downlink transmission beam being associated with a portion within a second sector (column 3, lines 31-37; e.g., " ...respective first and second beams..."; where each beam corresponds to a sector); diversity encoding a first signal to produce a first diversity-encoded signal; diversity encoding a second signal to produce a second diversity-encoded signal (column 3, lines 18-19; where the signals were encoded according to the different "power coefficient indicators"); sending the first diversity-encoded signal over the first downlink transmission beam; and sending the second diversity-encoded signal over the second downlink transmission beam (column 3, lines 33-37; e.g., "transmits the first and second signals in respective first and second beams").

Regarding claims 3 and 37, Ylitalo teaches all the limitations of claims 1 and 36, respectively. Ylitalo further teaches where the first sector substantially corresponds to the second sector (column 1, lines 49-50; e.g., "diversity antennas...with overlayed sectors").

Regarding claims 4 and 38, Ylitalo teaches all the limitations of claims 1 and 36, respectively. Ylitalo further teaches where the first sector differs from the second sector (column 1, lines 49-50).

Regarding claims 7 and 24, Ylitalo teaches all the limitations of claims 1 and 22, respectively. Ylitalo further teaches where the first downlink transmission beam is associated with a first polarization, the second downlink transmission beam is associated with a second polarization substantially orthogonal to the first polarization (column 5, lines 6-12).

Regarding claims 8 and 25, Ylitalo teaches all the limitations of claims 7 and 24, respectively. Ylitalo further teaches where the first sector substantially corresponds to the second sector, and the portion within the first sector substantially corresponds to the portion within the second sector (column 6, lines 22-26; e.g., "two discernible beams...but otherwise cover the same sector").

Regarding claims 9 and 26, Ylitalo teaches all the limitations of claims 7 and 22, respectively. Ylitalo further teaches where the portion within the first sector differs from the portion within the second sector (column 6, lines 22-26; e.g., "...cover different sectors").

Regarding claims 10 and 27, Ylitalo teaches all the limitations of claims 1 and 22, respectively. Ylitalo further teaches where the portion within the first sector overlaps, at least partially, with the portion within the second sector (column 6, lines 22-26; e.g., "two discernible beams...but otherwise cover the same sector").

Regarding claims 11 and 28, Ylitalo teaches all the limitations of claims 1 and 22, respectively. Ylitalo further teaches where the first downlink transmission beam is sent from a first antenna array, and the second downlink transmission beam is sent from a second antenna array (column 3, lines 2-7; column 22, lines 18-19).

Regarding claims 12 and 29, Ylitalo teaches all the limitations of claims 1 and 22, respectively. Ylitalo further teaches where the first downlink transmission beam is sent during a first time period, and the second downlink transmission beam is sent during a second time period (column 1, lines 22-31; e.g., "only one beam is transmitted at a time...) that overlaps, at least partially, with the first time period (column 1, lines 39-43; where 20 wavelenghts of separation makes room for time overlap).

Regarding claims 14 and 31, Ylitalo teaches all the limitations of claims 1 and 22, respectively. Ylitalo further teaches where the first downlink transmission beam is associated with a first uplink multipath from a plurality of uplink multipaths associated with a first user, the second downlink transmission beam is associated with a second uplink multipath from the plurality of uplink multipaths, the first uplink multipath and the second uplink multipath being no less optimal than the remaining uplink multipaths from the plurality of uplink multipaths (column 1 lines 27-29; where the uplink multipath signals received at different channels are different. Also, by auto-selection, the best signals will reach the receiver faster leaving the less optimal behind).

Regarding claim 15, Ylitalo teaches all the limitations of claim 1. Ylitalo further teaches where the diversity encoding further includes multiplexing a first pilot signal and an information signal to produce a first multiplexed signal (figure 12, item 105; column

21, lines 45-49; where "training signal" corresponds to "pilot signal"); spreading and scrambling the first multiplexed signal to produce a first spread/scrambled signal (column 2, lines 17-21); and modifying the first spread/scrambled signal based on a first feedback signal (column 30, lines 49-54; where the uplink signals are the reference to determine the angular spreading).

Regarding claim 16, Ylitalo teaches all the limitations of claim 15. Ylitalo further teaches where the diversity encoding further includes: multiplexing a second pilot signal and the information signal to produce a second multiplexed signal (figure 12, item 107; column 21, lines 45-49; where "training signal" corresponds to "pilot signal"); spreading and scrambling the second multiplexed signal to produce a second spread/scrambled signal (column 2, lines 17-21); and modifying the second spread/scrambled signal based on a second feedback signal (column 30, lines 49-54; where the uplink signals are the reference to determine the angular spreading.

Regarding claim 17, Ylitalo teaches all the limitations of claim 1. Ylitalo further teaches where the determining includes: identifying a first multipath component and a second multipath component of the received user-derived signal for a first user, the first multipath component and the second multipath component being no less optimal than remaining multipath components of the received user-derived signal for the first user (column 1 lines 27-29; where the uplink multipath signals received at different channels are different. Also, by auto-selection, the best signals will reach the receiver faster leaving the less optimal behind); identifying a first angular arrival range and a second angular arrival range based on the first multipath component and the second multipath

component, respectively; and defining the first downlink transmission beam and the second downlink transmission beam based on the first angular arrival range and the second angular arrival range (column 18, lines 11-36; where the angles of arrival spreads are considered for the multi-paths of the individual signals).

Regarding claims 18 and 32, Ylitalo teaches all the limitations of claims 1 and 22, respectively. Ylitalo further teaches where the first signal and the second signal are diversity encoded based on the received user-derived signal (column 3, lines 23-37; where they are diversely space-time encoded).

Regarding claims 19 and 33, Ylitalo teaches all the limitations of claims 1 and 22, respectively. Ylitalo further teaches where the first signal and the second signal are diversity encoded based on at least one characteristic of the received user-derived signal from the group of: a signal quality, a data rate, a signal strength, and a signal cross-correlation property (column 3, lines 23-28; e.g., "...based on the respective first and second initial transmit powers"; where the examiner ahs selected "signal strength" from the choices provided).

Regarding claims 21 and 35, Ylitalo teaches all the limitations of claims 1 and 22, respectively. Ylitalo further teaches the first diversity-encoded signal is associated with its own diversity code, the second diversity-encoded signal is associated with its own diversity code that is separable from the diversity code associated with the first diversity-encoded signal (column 4, lines 60-66).

Regarding claim 22, Ylitalo teaches of a method for wireless communication; column 1, lines 7-11; e.g., "down link signal transmission from a base station of a

cellular radio system to a remote station"; and title of the application), comprising: receiving a first diversity-encoded signal from a first downlink transmission beam; and receiving a second diversity-encoded signal from a second downlink transmission beam, the first downlink transmission beam being substantially uncorrelated with the second downlink transmission beam (column 3, lines 34-37; where spaced-time coded signals are contained within an uncorrelated angular spread; also, column 1, lines 49-53), the first downlink transmission beam being associated with a portion of a first sector, the second downlink transmission beam being associated with a portion of a second sector.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 2, 5- and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ylitalo in view of Ionescu (Ionescu, Dumitru Mihai; Patent No.: 6,603,809 B1).

Regarding claim 2, Ylitalo teaches all the limitations of claim 1.

Ylitalo does not specifically teach where the first signal and the second signal are diversity encoded so that an associated decoder error rate is less than a decoder error rate for one diversity-encoded signal.

In related art, concerning an apparatus and method for forming a singular signal for communication upon a fading channel, Ionescu teaches where the first signal and the second signal are diversity encoded so that an associated decoder error rate is less than a decoder error rate for one diversity-encoded signal (column 3, lines 28-39; e.g., " the space-time code is implemented as an encoder at a sending station and decoder at the receiving station...in terms of bit error probability"; where if the signals are diversely encoded, the BEPs are going to be different, one less than the other).

It would have been obvious to a one of ordinary skill in the art at the time the invention was made to combine Ylitalo's method for wireless communication with Ionescu's decoder error rate in order to optimize the overall performance of the transmission scheme, as taught by Ionescu.

5. Claims 5, 6, 13, 23 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ylitalo (Ylitalo et al.; US Patent No 6,788,661 B1) in view of Dajer (Dajer et al.; US Patent No.: 6,539,209 B1).

Regarding claim 5, Ylitalo teaches all the limitations of claim 1. Ylitalo further teaches the first antenna array differs from the second antenna array (column 3, lines 2-7; column 22, lines 18-19).

Ylitalo does not specifically teach where

Dajer teaches where the received user-derived signal includes a first component and a second component, the first component of the received user-derived signal being received on a first antenna array, the second component of the received user-derived signal being received on a second antenna array.

In related art, concerning a code-division multiple-access base station having transmit diversity, Dajer teaches where the received user-derived signal includes a first component and a second component (column 2, lines 61-63), the first component of the received user-derived signal being received on a first antenna array, the second component of the received user-derived signal being received on a second antenna array (column 3, lines 2-7; where a first and second components are received on different antennas).

It would have been obvious to a one of ordinary skill in the art at the time the invention was made to combine Ylitalo's method for wireless communication with Dajer's first and second components in order to apply orthogonal transmit diversity, as taught by Dajer.

Regarding claim 6, Ylitalo teaches all the limitations of claim 1. Ylitalo further teaches where the first antenna array substantially corresponds to the second antenna array (column 5, lines 6-12; "a single antenna...to generate two beams...but otherwise cover the same sector). Dajer teaches where the received user-derived signal includes a first component and a second component (column 2, lines 61-63), the first component of the received user-derived signal being received on a first antenna array, the second component of the received user-derived signal being received on a second antenna

array (column 3, lines 2-7; where a first and second components are received on different antennas).

Regarding claims 13, 23 and 30, Ylitalo teaches all the limitations of claims 1, 22 and 22, respectively. Dajer teaches where the first downlink transmission beam is associated with a first frequency range, the second downlink transmission beam is associated with a second frequency range at least a portion of which is different from the first frequency range (column 11, lines 28-37; e.g., "output signals might be transmitted over at least two carriers within different frequency range").

6. Claims 20, 34, 39-52 and 53-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ylitalo in view of Dajer, and further in view of Thibault (Thibault et al., US Patent no.: 6,240,098 B1).

Regarding claims 20 and 34, Ylitalo teaches all the limitations of claims 1 and 22, respectively. Ylitalo further teaches where the first component of the received user-derived signal being associated with its own multipath, the second component of the received user-derived signal being
associated with its own multipath (column 1 lines 27-29; where the uplink multipath signals received at different channels are different).

Ylitalo does not specifically teach where the received user-derived signal includes a first component and a second component.

In related art, concerning an apparatus and method for forming a singular signal for communication upon a fading channel, Dajer teaches where the received user-derived signal includes a first component and a second component (column 2, lines 61-63).

It would have been obvious to a one of ordinary skill in the art at the time the invention was made to combine Ylitalo's method for wireless communication with Ionescu's first component and a second components in order to apply orthogonal transmit diversity, as taught by Dajer.

Ylitalo in view of Dajer does not specifically teach where diversity encoding the first signal includes: determining a complex gain associated with the first diversity signal based on feedback information associated with the first component of the received user-derived signal; and the diversity encoding the second signal includes: determining a complex gain associated with the second diversity signal based on feedback information associated with the second component of the received user-derived signal.

In related art, concerning a method and device for space division multiplexing of radio signals transmitted in cellular radio communications, Thibault teaches where diversity encoding the first signal includes: determining a complex gain associated with the first diversity signal based on feedback information associated with the first component of the received user-derived signal; and the diversity encoding the second signal includes: determining a complex gain associated with the second diversity signal based on feedback information associated with the second component of the received user-derived signal (column 2, lines 33-36; e.g., "one complex fain per reception path"

corresponding to a gain associated with a first diversity signal and a gain associated with a second diversity signal).

It would have been obvious to a one of ordinary skill in the art at the time the invention was made to combine Ylitalo's and Dajer's combined method with Thibault's complex gain in order to separate the various signals received, as taught by Thibault.

Regarding claim 39, Ylitalo teaches all the limitations of claim 36. Ylitalo further teaches where the diversity coder includes: a first multiplexer configured to receive a first pilot signal and an information signal to produce a multiplexed signal (figure 12, item 105); a first spread/scramble module coupled to the first multiplexer, the first spread/scramble module configured to receive the multiplexed signal associated with the first multiplexer, the first spread/scramble module configured to produce a spread/scrambled signal (column 2, lines 17-21). Dajer teaches of a first complex-gain multiplier coupled to the first spread/scramble module (column 2, lines 17-21, the first complex-gain multiplier configured to receive the spread/scrambled signal associated with the first spread/scramble module and a first feedback signal (column 2, lines 33-36; e.g., "one complex fain per reception path" corresponding to a gain associated with a first diversity signal and a gain associated with a second diversity signal).

Regarding claim 40, Ylitalo teaches all the limitations of claim 39. Ylitalo further teaches where the diversity coder further includes: a second multiplexer configured to receive a second pilot signal and the information signal to produce a multiplexed signal (figure 12, item 107); a second spread/scramble module coupled to the second mutliplexer, the second spread/scramble module configured to receive the multiplexed

signal associated with the second multiplexer, the second spread/scramble module configured to produce a spread/scrambled signal (column 2, lines 17-21); and a second complex-gain multiplier coupled to the second spread/scramble module (column 2, lines 17-21, the second complex-gain multiplier configured to receive the spread/scrambled signal associated with the second spread/scramble module and a second feedback signal (column 2, lines 33-36; e.g., "one complex fain per reception path" corresponding to a gain associated with a first diversity signal and a gain associated with a second diversity signal).

Regarding claim 41, Ylitalo teaches all the limitations of claim 36. Ylitalo further teaches where the diversity coder further includes a space-time coder (figure 11, litem 10) configured to receive an information signal and configured to send a first space-time coded signal and a second space-time coded signal (figure 11, where the left side shows signals s1 and s2 being inputed in the space time encoder and the rights side shows the outputted signals), the first-space-time coded signal being orthogonal to the second space-time coded signal (column 5, lines 6-12); a first spread/scramble module configured to receive the information signal and configured to send a spread/scrambled signal; and a second spread/scramble module configured to receive the space-time coded signal and configured to send a spread/scrambled signal (column 30, lines 49-54).

Regarding claim 42, Ylitalo teaches all the limitations of claim 36. Ylitalo also, teaches where the first user-derived reception beam differs from the second user-derived reception beam, the first portion of the antenna array differs from the second

portion of the antenna array (column 3, lines 2-7; column 22, lines 18-19). Dajer further teaches where the searcher is configured to receive the received user-derived signal including a first component and a second component (column 2, lines 61-63), the antenna array includes a first portion and a second portion, the first component of the received user-derived signal being received from a first user-derived reception beam on the first portion of the antenna array, the second component of the received user-derived signal being received from a second user-derived reception beam on the second portion of the antenna array (column 3, lines 2-7; where a first and second components are received on different antennas).

Regarding claim 43, Ylitalo teaches all the limitations of claim 36. Ylitalo also teaches where the antenna array includes a first portion and a second portion (figure 12, items 16 and 18), the first component of the received user-derived signal being received from a first user-derived reception beam on the first portion of the antenna array, the second component of the received user-derived signal being received from a second user-derived reception beam on the second portion of the antenna array (column 3, lines 2-7; where a first and second components are received on different antennas), the first user-derived reception beam substantially corresponds to the second user-derived reception beam, the first portion of the antenna array substantially corresponds to the second portion of the antenna array (column 5, lines 6-12; "a single antenna...to generate two beams...but otherwise cover the same sector). Dajer further teaches where the searcher is configured to receive the received user-derived signal including a first component and a second component (column 2, lines 61-63).

Regarding claim 44, Ylitalo teaches all the limitations of claim 36. Ylitalo further teaches where the first downlink transmission beam is associated with a first polarization, the second downlink transmission beam is associated with a second polarization substantially orthogonal to the first polarization (column 5, lines 6-12).

Regarding claim 45, Ylitalo teaches all the limitations of claim 44. Ylitalo further teaches where the first sector substantially corresponds to the second sector, and the portion within the first sector substantially corresponds to the portion within the second sector (column 6, lines 22-26; e.g., "two discernible beams...but otherwise cover the same sector").

Regarding claim 46, Ylitalo teaches all the limitations of claim 36. Ylitalo further teaches where the portion within the first sector differs from the portion within the second sector (column 6, lines 22-26; e.g., "...cover different sectors").

Regarding claim 47, Ylitalo teaches all the limitations of claim 36. Ylitalo further teaches where the portion within the first sector overlaps, at least partially, with the portion within the second sector (column 6, lines 22-26; e.g., "two discernible beams...but otherwise cover the same sector").

Regarding claim 48, Ylitalo teaches all the limitations of claim 36. Ylitalo further teaches the antenna array includes a first portion and a second portion (column 3, lines 2-7; column 22, lines 18-19, the first downlink transmission beam is sent from the first portion of the antenna array, and the second downlink transmission beam is sent from the second portion of the antenna array (column 3, lines 2-7; column 22, lines 18-19).

Regarding claim 49, Ylitalo teaches all the limitations of claim 36. Ylitalo further teaches where the first downlink transmission beam is sent during a first time period, and the second downlink transmission beam is sent during a second time period (column 1, lines 22-31; e.g., "only one beam is transmitted at a time...) that overlaps, at least partially, with the first time period (column 1, lines 39-43; where 20 wavelenghts of separation makes room for time overlap).

Regarding claim 50, Ylitalo teaches all the limitations of claim 36. Dajer further teaches where the first downlink transmission beam is associated with a first frequency range, the second downlink transmission beam is associated with a second frequency range at least a portion of which is different from the first frequency range (column 11, lines 28-37; e.g., "output signals might be transmitted over at least two carriers within different frequency range").

Regarding claim 51, Ylitalo teaches all the limitations of claim 36. Ylitalo further teaches where the first downlink transmission beam is associated with a first uplink multipath from a plurality of uplink multipaths associated with a first user, the second downlink transmission beam is associated with a second uplink multipath from the plurality of uplink multipaths, the first uplink multipath and the second uplink multipath being no less optimal than the remaining uplink multipaths from the plurality of uplink multipaths (column 1 lines 27-29; where the uplink multipath signals received at different channels are different. Also, by auto-selection, the best signals will reach the receiver faster leaving the less optimal behind).

Regarding claim 52, Ylitalo teaches all the limitations of claim 36. Ylitalo further teaches where the determining includes: identifying a first multipath component and a second multipath component of the received user-derived signal for a first user, the first multipath component and the second multipath component being no less optimal than remaining multipath components of the received user-derived signal for the first user (column 1 lines 27-29; where the uplink multipath signals received at different channels are different. Also, by auto-selection, the best signals will reach the receiver faster leaving the less optimal behind); identifying a first angular arrival range and a second angular arrival range based on the first multipath component and the second multipath component, respectively; and defining the first downlink transmission beam and the second downlink transmission beam based on the first angular arrival range and the second angular arrival range (column 18, lines 11-36; where the angles of arrival spreads are considered for the multi-paths of the individual signals).

Regarding claim 53, Ylitalo teaches all the limitations of claim 36. Ylitalo further teaches where the first signal and the second signal are diversity encoded based on the received user-derived signal (column 3, lines 23-37; where they are diversely space-time encoded).

Regarding claim 54, Ylitalo teaches all the limitations of claim 36. Ylitalo further teaches where the first signal and the second signal are diversity encoded based on at least one characteristic of the received user-derived signal from the group of: a signal quality, a data rate, a signal strength, and a signal cross-correlation property (column 3,

lines 23-28; e.g., "...based on the respective first and second initial transmit powers"; where the examiner ahs selected "signal strength" from the choices provided).

Regarding claim 55, Ylitalo teaches all the limitations of claim 36. Ylitalo further teaches where the first component of the received user-derived signal being associated with its own multipath, the second component of the received user-derived signal being associated with its own multipath (column 1 lines 27-29; where the uplink multipath signals received at different channels are different).

Ylitalo does not specifically teach where the received user-derived signal includes a first component and a second component.

In related art, concerning an apparatus and method for forming a singular signal for communication upon a fading channel, Dajer teaches where the received user-derived signal includes a first component and a second component (column 2, lines 61-63).

It would have been obvious to a one of ordinary skill in the art at the time the invention was made to combine Ylitalo's method for wireless communication with Ionescu's first component and a second components in order to apply orthogonal transmit diversity, as taught by Dajer.

Ylitalo in view of Dajer does not specifically teach where diversity encoding the first signal includes: determining a complex gain associated with the first diversity signal based on feedback information associated with the first component of the received user-derived signal; and the diversity encoding the second signal includes: determining a

complex gain associated with the second diversity signal based on feedback information associated with the second component of the received user-derived signal.

In related art, concerning a method and device for space division multiplexing of radio signals transmitted in cellular radio communications, Thibault teaches where diversity encoding the first signal includes: determining a complex gain associated with the first diversity signal based on feedback information associated with the first component of the received user-derived signal; and the diversity encoding the second signal includes: determining a complex gain associated with the second diversity signal based on feedback information associated with the second component of the received user-derived signal (column 2, lines 33-36; e.g., "one complex fain per reception path" corresponding to a gain associated with a first diversity signal and a gain associated with a second diversity signal).

It would have been obvious to a one of ordinary skill in the art at the time the invention was made to combine Ylitalo's and Dajer's combined method with Thibault's complex gain in order to separate the various signals received, as taught by Thibault.

Ylitalo further teaches the first diversity-encoded signal is associated with its own diversity code, the second diversity-encoded signal is associated with its own diversity code that is separable from the diversity code associated with the first diversity-encoded signal (column 4, lines 60-66).

Regarding claim 56, Ylitalo teaches all the limitations of claim 36. Ylitalo further teaches the first diversity-encoded signal is associated with its own diversity code, the second diversity-encoded signal is associated with its own diversity code that is

separable from the diversity code associated with the first diversity-encoded signal (column 4, lines 60-66).

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angelica Perez whose telephone number is 703-305-8724. The examiner can normally be reached on 7:15 a.m. - 3:55 p.m., Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay Maung can be reached on 703-308-7745. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and for After Final communications.

Information regarding Patent Application Information Retrieval (PAIR) system can be found at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2600's customer service number is 703-306-0377.

Angelica Perez
(Examiner)

EDAN ORGAD
PATENT EXAMINER/TELECOMM.

Art Unit 2684

September 30, 2004